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## PERMIAN REPTILES

THE relationships of the South African and American Permian faunas have long been of profound interest, from both the geological and evolutionary standpoints. Students have now generally come to an agreement in the union of all the Permian and Triassic stegocrotaphic reptiles (exclusive of the Chelonia) under the single order Cotylosauria, but, until recently, the zygocrotaphic terrestrial reptiles have been distinguished under five or six ordinal names, though Broom is willing to unite the African forms under the ordinal or superordinal term Therapsida.

Within the past few years, beginning with the important collections made by Professor Case, the University of Chicago has acquired a very rich representation of the American Permian reptiles and amphibians, some six or seven of the thirty odd genera acquired represented by practically complete skeletons. Among the latest of these collections, discovered the past year by Mr. Paul Miller in the vicinity of Seymour, Texas, is a very nearly complete articulated skeleton of the remarkable genus described a few years ago as *Seymouria* by Broili, from two incomplete skulls. Almost nothing of the remainder of the skeleton has hitherto been known. Within the past year I described and figured a considerable part of a skeleton of a very small reptile, based upon two specimens of nearly identical size, under the name *Desmospondylus*, suggesting at the time the possible identity with either *Seymouria* or *Pantylus*. The name proves to be a synonym of *Seymouria*. Although the two specimens described are scarcely a third of the size of the adult, and both of the same size, they doubtless are juvenile, or embryonic. I also suspect that *Conodectes* Cope is the same genus, or at least is a closely allied genus; but the name is unworthy of priority, since the type was never really described or figured.

*Seymouria* presents such extraordinary characters, that, if we raise the Diadectidæ, Pariotichidæ and Pantylidæ to subordinal rank, as would be justified from the charac-

ters used to distinguish the South African groups, we must also elevate the Seymouriidæ to the same rank. I am, however, opposed to the erection of so many ordinal names; they are in large part merely confessions of ignorance. The family Limnoscelidæ, for instance, recently described by me from the Permian of New Mexico, shows certain intermediate characters between the Diadectidæ and Pareiasauridæ. For the present, it seems to me that the following classification will suffice: Order Cotylosauria, families Diadectidæ (Nothodontidæ Marsh), Limnoscelidæ, Pariotichidæ, Seymouriidæ, Pantylidæ, Pareiasauridæ and Procolophonidæ, the last two exclusively African and European, the others exclusively American.

And I would go still further; possibly some will think too far. The possession of a very perfect skull of *Edaphosaurus*, hitherto known from imperfect material only, convinces me that Broom is right in his acceptance of the views previously held by Cope, but which for some years have fallen into desuetude, that the African and the American therocrotaphic reptiles (that is, those with a lower temporal vacuity only) are likewise related in the same way and perhaps in the same degree. Broom would still retain their ordinal distinction, but I am disposed to go further and reunite them under the name originally applied by Cope to the Pelycosauria and Anomodontia—Theromera or Theromorpha. The working out of the genus *Casea*, recently described by me, has disclosed many aberrant characters, separating the genus more widely from the Pelycosauria than are any two groups of Broom's Therapsida. But, I repeat, I am not willing to make so many new orders; it serves no useful purpose; and both *Edaphosaurus* and *Casea* would require ordinal distinction if we accept the groups of Therapsida as orders. I therefore propose the following classification of the therocrotaphic reptiles (excluding the Theriodontia): order Theromera; suborders Pelycosauria, Poliosauridæ, Edaphosauridæ, Caseidæ, Aræoscelidæ (?), Therocephalia, Anomodontia, Dinocephalia and Dromasauria, the first five American, the others African. I leave the

family termination to some—one can do what he chooses with them. S. W. WILLISTON

### SOCIETIES AND ACADEMIES

#### THE PHILOSOPHICAL SOCIETY OF WASHINGTON

THE 691st (40th anniversary) meeting was held on March 11, 1911, President Day in the chair. The evening was devoted to hearing the annual address of the retiring president, Mr. R. S. Woodward, who spoke of the "Meaning of Research."

The speaker mentioned the importance of the time element in measuring progress in research, and stated that we are often prone to measure progress by months and years instead of decades. As a study of the society may throw some light on the meaning of research, the speaker briefly reviewed the great work the Philosophical Society, which is yet young, has done, what it is for and what it may do.

The society has had thirty-two presidents, of whom the speaker had known all except two, and he had worked with two thirds of them. The chief work of many of these were mentioned. Forty years ago was a time of profound intellectual agitation, the principal cause of which was Darwin's "Origin of Species," and it is probable that the Philosophical Society was due to the great influx of new ideas coming at that time. Stirring intellectual enterprise (not repose) was the order of the day. At that time biology was the most conspicuous sign of the intellectual uprising; the work of Kelvin and Tait, and Maxwell was not more revolutionary than Darwin's. Progress has since been at an accelerated rate. Applications of results of physical science have multiplied ten to one hundred fold.

The development of scientific work by the government was described at some length, mention being made of a number of departments and individuals therein that have contributed to both practical and theoretical results in many branches of science, including medicine, most of which had been done by members of the Philosophical Society. The characteristic features of research by members of the society during these years were mentioned.

Research has not been understood by the masses, and has not generally been recognized as a vocation. The methods of science are now coming to be recognized by all as the best method for the discovery of truth. The meaning of research is best recognized by the fruits of this and other similar societies.

The chair expressed the thanks of the society to the speaker for his excellent address. The address will soon appear in full in a bulletin of the society.

THE 692d meeting of the society was held in the new auditorium of the National Museum on March 25, 1911, this being a joint meeting with the Washington Academy of Sciences. The evening was devoted to hearing an address by Dr. Svante Arrhenius, by invitation, on the subject of "The Atmosphere of the Planets."

The constitution of the sun and its probable temperature were briefly mentioned. Owing to its gaseous condition the specific gravity of the sun is about one fourth that of the earth, that of Jupiter and Saturn being about the same as that of the sun. The majority of the planets are void of an atmospheric envelope. The moon's atmosphere is about one thousandth that of the earth.

The critical velocities of bodies at the earth and at the moon were mentioned. In speaking of the critical velocities of various substances at the moon it was stated that hydrogen and helium had long ago flown off from the moon.

The minor planets, lying in orbits between the sun and Mars, have no atmosphere. Mars, Venus and the earth only, have an atmosphere. Venus has a very heavy atmosphere and which is now like that of the earth ages ago.

Laplace's theory of the extension of the sun's gases to Neptune and Uranus was mentioned.

The question of how the earth got its present atmospheric properties was discussed. When the temperature of the earth reached 55° C. organisms could live. The polar regions of Venus are about 60° C. and organisms may live there.

In discussing the important function of the existence of CO<sub>2</sub> in the atmosphere, it was stated that the time will come when the amount of it will dangerously decrease, and finally all of it and some of the water will go from the earth, the earth will grow colder and the rest of the water will freeze.

Mars is now a desert with a low temperature, its atmosphere is about one twentieth that of the earth. This will nearly all vanish, especially when the sun's radiation allows Mars to cool down. This is the fate of all planets.

President Day, of the Philosophical Society, thanked the speaker, on behalf of the joint meeting, for his very interesting address.

R. L. FARIS,  
*Secretary*